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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/826,301
Filing Date: April 19, 2004
Appellant(s): HIROSE ET AL.

Keiko K. Takagi
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 8/29/07 appealing from the Office action
mailed 1/25/07.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is substantially correct. Please note that the second paragraph is the summary of the sole independent claim, claim 1.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is substantially correct. Please note that there are two separate grounds for rejections.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

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US 6,723,422	HIROSE	4-2004
US 6,464,873	TOMASCHKE	10-2002
WO 99/01208	HIROSE	1-1999

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1-5 and 7 are rejected under 35 U.S.C. 102(b) as being anticipated by WO99/01208 (US equivalent to Hirose, US 6,723,422 is used for the rejection).

Hirose teaches a method of making a polyamide membrane over a porous support film by interfacial polymerization of a polyfunctional amine and a polyfunctional acid chloride in presence of an organic acid and sodium hydroxide. Solution 'A' contains polyacrylic acid or other organic acids – column 4, lines 29-42 – to facilitate formation of the membrane or to improve membrane properties. Solution A also contains salts of organic acids – column 4, lines 37-42. Solution A contains surfactants – the sulfonates, and sulfates of sodium, which are salts of sodium hydroxide and the

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corresponding organic acids – column 4, lines 43-47. The reference also teaches in column 5, lines 33-37:

"Furthermore, for accelerating the polycondensation reaction at the interface, it is effective to use sodium hydroxide or sodium tertiary phosphate in the solution A, which is capable of removing a hydrogen halide formed during the interfacial reaction or to use an acylation catalyst." [underline added]

Thus the reference teaches that the porous membrane is contacted with solution A, which has the amine with two reactive amino groups, an organic acid such as polyacrylic acid, and sodium hydroxide, in addition to other ingredients like surfactants. The porous membrane loaded with all these stuff is then contacted with the solutions B and C, which are the acid chloride solution in organic solvents. Thus the reaction takes place as is expected in the claims. In addition, the reference teaches further contacting the porous support formed with the layer with sodium hydroxide in column 4, lines 13-21, which when combined with the quotation from column 5 above, would show that the reaction proceeds further to completion when contacted with sodium hydroxide, because it removes the hydrogen halide formed, thereby accelerating the reaction. Also, example 1 describes camphor sulfonic acid (an organic acid) as the acid ingredient in solution A.

Thus the reference teaches that the reaction takes place in the presence of an organic acid and sodium hydroxide, and anticipates the claims.

Temperature is 120C. The pH is 8-13 when NaOH is used on the polysulfone porous membrane, which overlaps the range.

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2. Claims 1-7 are rejected under 35 U.S.C. 102(b) as being anticipated by Tomaschke (US 6,464,873).

Tomaschke teaches a method of making a polyamide membrane by interfacial polymerization (see example 1) of a polyamine (bipiperidine) and a polyacid chloride (trimesoyl chloride) in the presence of camphor sulfonic acid (formed by hydrolysis of TEACSA in water: column 7, lines 35-45: strong acids such as sulfonic acids react completely with water to form hydronium ion - the acid) and sodium hydroxide on polysulfone porous membrane. Temperature is above 100C. Regarding the pH adjustment, see column 8 lines 12-46. Normality ratio of the organic acid to sodium hydroxide would be inherently in the range claimed because the reference teaches the resultant pH falls in the same range claimed.

Response to Arguments submitted 1/4/07 in response to the non-final rejection:

Applicant's arguments filed 1/4/07 have been fully considered but they are not persuasive.

With respect to the Hirose reference, the argument that it does not teach "... an alkali metal hydroxide and an organic acid" is not convincing. As shown in the rejection, the reference expressly teaches adding both an organic acid and NaOH. Even if no other organic acid is added, the mixed acid chloride used in the reaction itself would be sufficient to anticipate the claims (Claim requires one polyfunctional acid chloride. Therefore, other acid chlorides in the mixture would support the claim language of an organic acid: acid chloride in presence of water would hydrolyze to form the acid.)

With respect to Tomaschke, the reference teaches hydrolyzing the TEACSA with sodium hydroxide, which means the solution would have camphor sulfonic acid and sodium hydroxide (all together) in solution during the process. Thus the claims are anticipated. Applicant's arguments are also not commensurate with the claims, because the claims do not recite that they are all reacted together.

(10) Response to Argument

A. Claim 1-5 and 7 are anticipated by Hirose:

Appellant's argument:

"Claim 1 recites "reacting a polyfunctional amine ingredient with a polyfunctional acid ingredient in the presence of at least an alkali metal hydroxide and an organic acid" (underline added)". Appellant argues that during the process step C of Hirose, a polyamide skin layer is formed on the porous support, and during this process, there is no alkali metal hydroxide or organic acid present, and that the acid and/or alkali solution is added after the skin layer is formed. This argument is not accurate.

Hirose teaches contacting the porous polysulfone membrane first with a solution A, which contains among other things, polyacrylic acid (column 4, lines 29-35) or camphor sulfonic acid (example 1), etc., and sodium hydroxide (column 5, lines 33-37). The porous polysulfone membrane is then contacted with solutions B and C, which are the polyfunctional acid chloride solutions in hydrocarbon solvents. After solution C, the polysulfone porous membrane is then *preferably* contacted with an aqueous solution of an acid or sodium hydroxide.

Appellant's contention is that the membrane is already formed at step C, and therefore, the process of Hirose does not anticipate claim 1. The examiner disagrees with this argument. The claim requires only the reaction of polyfunctional amine and the polyfunctional acid to take place in the presence of an organic acid and an alkali metal hydroxide. The polysulfone porous membrane is first loaded with the polyamine and an organic acid, such as polyacrylic acid, and sodium hydroxide. Then it is contacted with the polyacid, followed by the sodium hydroxide solution. Thus the reference teaches contacting the porous membrane with all the ingredients as recited. ***All the ingredients can be present at one time in the solution.***

Even if the addition of sodium hydroxide in solution A were not to take place as described in column 5, lines 33-37, there is sufficient teaching in the reference for the reaction to take place in presence of all the ingredients recited in the claims.

Appellant's claims do not recite any specific order in which the ingredients are/should be added. Also, the premise that in Hirose the reaction is complete as soon as the membrane makes contact with the solution C is also not proper.

While it can be argued that the interfacial polymerization would commence as soon as the porous polysulfone membrane is contacted with the solutions B and C, there is no reason to believe that the reaction would stop, or is complete, when the porous polysulfone membrane is removed from solution B and C, and before it is made to contact with the sodium hydroxide solution. Column 5, lines 33-37 teaches that the fate of the reaction is determined by the sodium hydroxide solution as well, and that the

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sodium hydroxide solution would have some degree of control over the reaction that takes place, such as accelerating it.

Considering applicant's disclosure, applicant adds an organic acid and sodium hydroxide in the polyfunctional amine solution. However, looking at applicant's working examples, five out of six examples show the pH of the polyamine solution as either neutral or in the acidic range. Thus there is no free sodium hydroxide in any of these solutions. The reference examples or the comparative examples show higher pH's but the membrane performance from the resulting membranes is not as good. Therefore, there appears no particular significance of having sodium hydroxide as an ingredient in the reaction in the working examples, except that it is added to control the pH of the solution.

II. Claims 1-7 are anticipated by Tomaschke:

Example 1 of Tomaschke teaches adding TEASCA, which is a salt of camphor sulfonic acid and triethylamine, and sodium hydroxide. TEASCA would completely react with water to form hydronium ion (the *organic* acidic entity in water) – see column 7, lines 35-45. Therefore, the example 1 has both an organic acid and sodium hydroxide present. Moreover, claim 1 is open-ended; presence of other ingredients such as triethylamine is not excluded from the claim. Claim 1 also does not recite how the organic acid is added; it only requires that the reaction take place in the presence of an organic acid and an alkali metal hydroxide. It does so in the reference.

Appellant's argument, "Since TEASCA is a salt of triethylamine and camphor sulfonic acid, it cannot be considered that the triethylamine part of TEASCA reacts with trimesoyl chloride", does not appear to have anything to do with the claim or the teaching of the reference. Presence of triethylamine in the solution would not negate anticipation because applicant's open-ended claims do not exclude any such ingredients.

It was pointed out in the advisory action that bipiperidine is a cyclo-aliphatic amine – it is both cyclic and aliphatic - and therefore reads on the claim.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

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For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Handwritten signature of Krishnan S Menon and the date 10/11/07.

Krishnan S Menon
Primary Examiner
Art Unit 1723

Conferees:

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